



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,378	10/12/2006	Thomas Christ	6741P090	8055
45962 7590 02/04/2008				
SAP/BLAKELY				
1279 OAKMEAD PARKWAY				
SUNNYVALE, CA 94085-4040				
EXAMINER				
MOFFAT, JONATHAN				
ART UNIT		PAPER NUMBER		
2863				
MAIL DATE		DELIVERY MODE		
02/04/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/562,378

Applicant(s)

CHRIST ET AL.

Examiner

JONATHAN MOFFAT

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's amendments to the claims, filed 12/12/2007, are accepted and appreciated by the examiner. Further, applicant's submission of clean copies of the specification and abstract are also appreciated. Applicant has amended each independent claim and altered the scope of the claimed invention. This rejection is therefore made **final**.

Claim Objections

Claims 1, 13 and 19 are objected to because of the following informalities:

In each of these independent claims, reference is made to scheduling a resource to travel based upon its priority as compared to the priority of "a scheduled task". Although the specification supports this, there is no claim limitation that gives any specific interpretation to what "a scheduled task" may comprise, how it is scheduled, or how it and the request are assigned "priorities".

In general, the focus of these claims appears to be the same as in previous iterations; determining a path distance. As discussed in the telephonic interview on 12/5/2007, this is a known concept. The examiner suggested a higher-level view of specific scheduling with path planning as a subsidiary. As it stands, however, the path planning is not functionally linked to the scheduling functionality. The schedules and priorities do not appear to functionally affect which path is taken, or which resources travel which path. The scheduling only determines WHEN said path is taken. As shown in more detail in the rejection below, one of ordinary skill in the art would find it obvious to "schedule" a resource to travel on a path in a warehouse or similar environment. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1.

Claims 1-7, 9-20 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poppen (US pat 5916299) in view of Tabata (US pat 4982329), Jacobs (US pat pub 20030030399), Teig (US pat 6879934), McNeil (US pat 6429016) and Brickner (US pat 4973219).

With respect to claims 1 and 13, Poppen discloses a method comprising:

1) Determining the distance within the source zone between the first location and an exit node of the source zone (Fig 5 item 303).

2) Determining the distance between the exit node of the source zone and an entry node of the destination zone (Fig 5 item 305).

3) Determining the distance within the destination zone between the entry node of the destination zone and the second location (Fig 5 item 304).

4) Obtaining the path length by summing up the distances determined in the preceding steps (Fig 5 item 306 and column 6 lines 27-41 and column 10 lines 32-34).

5) Scheduling a resource to travel a path (Fig 5. This is assumed or else the planning of the route would have no functional value).

With respect to claim 19, Poppen discloses a method comprising:

1) Defining a first plurality of zones, each zone representing a grouping of bins, or a work center, whereby with each zone, at least one node is associated, the node representing an entry and/or exit point for resources to/from the zone (Fig 6), and whereby with each bin and with each node in a zone, coordinates are associated which are representative of their location in the zone (column 4 lines 11-20).

2) Defining a first plurality of routes, each route representing a path for movement of a resource between nodes of a pair of zones (Fig 6 items A-C and B-E etc), whereby with each of the routes, a path length is associated which is representative of the length of the route (Figs 5-6).

3) Defining a second plurality of routes, each route representing a path for movement of a resource within a zone between a bin and a node of the zone (Fig 6 items C-D and D-F etc), whereby with each of the routes, a path length is associated which is representative of the length of the route (Fig 5-6).

4) Scheduling a resource to travel a path (Fig 5. This is assumed or else the planning of the route would have no functional value).

With respect to claims 2 and 6, Poppen discloses distances within zones (column 1 line 40) which must have been determined or calculated at some point according to a metric given the broadest reasonable interpretation of the term. The examiner is unsure what sort of metric is excluded by the limitation of "Euclidean or Manhattan metric". Euclidean allows for line interconnections in any direction. However, to further show obviousness, the examiner points to reference Teig, which discloses both sorts (Figs 2 and 18 and column 4 lines 41-50) in determining distances between points.

With respect to claims 4-5, Poppen discloses locations and nodes defined by coordinates (column 4 lines 11-20).

With respect to claim 9, Poppen discloses that the distances between nodes of two different zones are looked up in a table which comprises pre-calculated distances of each pair of nodes of different zones (Fig 4 and column 11 line 64 – column 12 line 7).

With respect to claim 11, Poppen discloses a route based on properties of at least one of a resource, a route and a node (Figs 4 and 8a-b and column 1 lines 35-48).

With respect to claims 12 and 16, Poppen discloses a path determined which is the shortest path between the first and second locations (Fig 8b item 331b).

With respect to claim 17, Poppen discloses that the one path is determined which satisfies best a cost criterion, the cost criterion taking into account at least one of distances of the routes, travel time for the resource on the routes, and characteristics of the resources (Figs 4 and 8a-b and column 1 lines 35-48).

With respect to claim 18, Poppen discloses that each route determining step is followed by a step of calculating a cost criterion, whereby calculating the cost criterion takes into account at least one of distances of the respective determined route, travel time for the resource on the respective determined route, and an average value of characteristics of all the resources for the respective determined route (Figs 4 and 8a-b and column 1 lines 35-48).

With respect to claims 29-31, Poppen discloses computer-readable storage medium for running such a program (column 1 lines 35-48).

With respect to claims, 1, 10, 13 and 19, Poppen fails to disclose paths in a warehouse for movement of resources between locations.

With respect to claims 1, 13 and 19, Poppen discloses determining the path between points and states that the distance is known (column 1 lines 35-48 and column 4 lines 11-20). Although Poppen does not use the language of “determining the distance” per se one of ordinary skill in the art would understand that this is one output data Poppen would generate. Even though this is obvious, the examiner points to references Jacobs and Tabata below which further show this as obvious in the application of a robot.

With respect to claims 1, 13 and 19, Poppen fails to disclose:

The scheduling of the resource is based on a comparison of a priority of the request with a priority of a scheduled task.

With respect to claims 3 and 7, Poppen fails to disclose how distances between these nodes are determined. The examiner maintains, however, that using a line-of-sight based device such as a rangefinder, radar, GPS, or other device would have been obvious to one of ordinary skill in the art and that such a method would inherently generate a distance that is the “direct way”. Further, in light of the combination of Poppen with various example robotic systems (McNeil Tabata and Jacobs) below, the examiner further believes that such types of range finding are obvious. Tabata, for instance discloses ultrasonic line-of-sight rangefinding (Fig 2 items 6L and 6R).

With respect to claims 13 and 19, Poppen fails to disclose determining routes to pick and drop points (bins) associated with each zone and determining the distance thereto. Poppen does disclose several node points along a path in various zones (Fig 6).

With respect to claims 14-15 and 20, Poppen fails to disclose a resource determined to move on a given route and that only routes where said resource is able to move are determined.

However, Poppen does disclose foreknowledge of the physical characteristics of the routes and whether or not one would be suitable for choosing (column 1 lines 56-60). In the below application of the method of Poppen to a warehouse robot, the examiner believes that such features are obvious. It would be a major oversight to plan a route for a robot that would not allow for its passage (with a large load as in Tabata) or with a potentially hazardous load in the case of McNeil and pharmaceutical components. One of ordinary skill in the art would have found it obvious to ensure that the route is applicable to the load in question.

Tabata teaches, with respect to claims 1, 10, 13 and 19, determining the distances between points in a warehouse (column 4 lines 1-21). Tabata teaches, with respect to claim 13, points associated with a route (column 2 lines 40-67).

Jacobs teaches, with respect to claims 1, 10 13 and 19, determining the distances between points in a warehouse (paragraph 0093). Jacobs further teaches robots needing to return periodically to re-supply/recharging docks (paragraph 0126). Since this particular robot is stated to fill up on cleaning supplies (resources) and deposit them, these could comprise pick-up and drop-off locations.

McNeil teaches, with respect to claim 13 and 19, drop-off and pickup points for resources (bins) within a warehouse (column 16 lines 42-58) and robots needing to return to a recharging dock (column 8 lines 37-39).

It would have been obvious to one of ordinary skill in the art that the method of Poppen be applied to controlling warehouse robots such as those of Tabata, Jacobs and McNeil. The examiner believes that the intent of Poppen is to present a navigation analysis method applicable to many things besides roads and driving (column 1 lines 21-60) including maps in

general. Jacobs further discloses a similar concept of work zones and nodes forming a path based upon a map (paragraphs 0051 and 0056). One of ordinary skill in the art would have found it obvious to apply these principles to the navigation of robots in general of which Tabata, Jacobs and McNeil are examples in the art. Such combination would include determination of path distances including to pickup or drop-off points of resources as taught by these references. Both McNeil and Jacobs disclose the need for robots to return to docking stations to re-supply or refuel and both Jacobs and McNeil disclose robots being applied for picking up and dropping off (Tabata implies such application since it is used in luggage handling but does not specifically point it out). One of ordinary skill in the art would have found it obvious to program in such stops along the path or before beginning a functional journey. The robot would leave the docking station, report to the pickup location, move to the drop-off and then dock once more or perform further tasks before ultimately returning to dock. The examiner maintains that plotting and programming additional points for the robot to travel to within various zones would have been obvious to one of ordinary skill in the art.

Brickner teaches, with respect to claims 1, 13 and 19:

Scheduling a resource to travel a path between the first location and the second location (Figs 1-3), the scheduling of the resource is based on a comparison of a priority of the request with a priority of a scheduled task (column 17 line 63 – column 18 line 14).

It would have been obvious to one of ordinary skill in the art to modify the method of Poppen by accounting for the priority of various scheduled tasks before initiating travel along a path. As stated above, one of ordinary skill in the art would find it obvious to “schedule” the movement of resources. Further, as stated by Brickner, in the case of limited ability to move

resources (limited machinery or, in this case, remote movers) it is beneficial to assign priority in order to maximize the usage of the system.

2.

Claims 8 and 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poppen, Teig, Tabata, Jacobs, McNeil and Brickner as applied to claims 7 and 20 above, and further in view of Anderson (US pat pub 20040068352).

With respect to claim 22, Poppen discloses a mandatory route representing a forced route (Fig 6 items H and I which have only once choice in going to any other locations). Further, in the combination of the method of Poppen with a robotic system as in Tabata, Jacobs or McNeil, one of ordinary skill in the art would assume that there may arise a situation where only one path is available (i.e. to go through the only door to leave a room for example). Additionally, one of ordinary skill in the art would understand that certain sized (or types in the chemical environment of McNeil) may require certain paths for fit or safety.

With respect to claim 23, Poppen disclose that there may be any number of possible routes or groupings of routes (Figs 2-4). The addition of further options or nodes is obvious.

With respect to claim 24 it must be assumed that each resource type has associated attributes descriptive of physical properties of the resource type. Although the references do not explicitly state this, one of ordinary skill in the art would know that a resource inherently has associated attributes that describe it. The language of the claim does not indicate what is done with these attributes, how they are assigned, or how they relate to the invention as a whole.

With respect to claim 25 Poppen discloses associating with each node attributes which are descriptive of physical properties of the node (column 1 lines 47-58).

With respect to claim 26, Poppen discloses associating with each route attributes, which are descriptive of physical properties of the route (column 1 lines 38-49).

With respect to claim 27, Poppen discloses that the second and third pluralities of routes are stored in a set of tables, each of the routes being reference able by the two nodes between which the route is defined (column 11 line 64 – column 12 line 7).

With respect to claim 28, Poppen discloses defining a second plurality of zones with entrance and exit nodes (Fig 6). The addition of further options or nodes is obvious as Poppen discloses that there may be any number of “tiles”. While Poppen does not disclose a warehouse, the above combination with the robotic arts of Tabata, Jacobs and McNeil renders this obvious as stated above.

With respect to claims 8 and 21, Poppen, Teig, Tabata, Jacobs, McNeil and Brickner fail to disclose detection of an obstacle with avoidance. Jacobs and Tabata each disclose sensors for avoiding a collision and Poppen discloses foreknowledge of routes that will not work (an obstacle of sorts) (column 1 lines 56-60).

Anderson teaches, with respect to claims 8 and 21, factoring in obstacles and directing the route around such an obstacle (column 3 lines 12-17 and column 5 lines 47-52).

It would have been obvious to one of ordinary skill in the art to modify the method of Poppen, Teig, Tabata, Jacobs and McNeil by including obstacle plan-around points. Poppen seems to indicate that this is the intention (column 1 lines 56-60) as a criteria included among cost etc. Anderson presents cost reduction as a similar goal (Figs 2-3b).

Response to Arguments

Applicant's arguments with respect to claims 1-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Levine (US pat 7283971) concerns scheduling of work resources (including people and machinery) in general.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN MOFFAT whose telephone number is (571)272-2255. The examiner can normally be reached on Mon-Fri, from 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/jm/
JM
1/29/2008

/John E Barlow Jr./
Supervisory Patent Examiner,
Art Unit 2863